CLAIMS

What Is Claimed Is:

1. A liposome for introducing an organic nanotube into a cell, comprising:
   (a) a lipopeptide, said lipopeptide including a lipid covalently attached to a peptide; and
   (b) an inactivated organic nanotube enclosed in the liposome.

2. A liposome according to claim 1, wherein the inactivated organic nanotube comprises a cyclic peptide.

3. A liposome according to claim 2, wherein the cyclic peptide comprises a cyclic D,L-α-peptide.

4. A liposome according to claim 3, wherein the cyclic D,L-α-peptide comprises from 1 to 38 amino acids.

5. A liposome according to claim 1, wherein the inactivated organic nanotube is activatable.

6. A liposome according to claim 5, wherein the inactivated organic nanotube is activatable by a change in pH.

7. A liposome according to claim 5, wherein the inactivated organic nanotube is activatable by a chemical reaction.

8. A liposome according to claim 5, wherein the inactivated organic nanotube is activatable by a change in temperature.

9. A liposome according to claim 5, wherein the inactivated organic nanotube is activatable by electromagnetic radiation.

10. A liposome according to claim 9, wherein the electromagnetic radiation is selected from the group consisting of ultraviolet radiation, visible radiation, infrared radiation and microwave radiation.

11. A liposome according to claim 1, wherein the inactivated organic nanotube is from 1 to 38 amino acids.

12. A liposome according to claim 1, wherein the liposome comprises an interior that has a pH from about 7.0 to about 14.5.

13. A method according to claim 1, wherein the liposome comprises an interior that is maintained at a pH from about 7.0 to about 10.5.

14. A liposome according to claim 1, wherein the lipid is attached to the peptide by way of an amide bond.

15. A liposome according to claim 1, wherein the lipopeptide comprises a fusion peptide.

16. A liposome according to claim 1, wherein the lipopeptide comprises a lysine residue at the C-terminus.

17. A liposome according to claim 2, wherein the cyclic peptide comprises one or more glutamic acid residues.

18. A liposome according to claim 2, wherein the cyclic peptide comprises one or more amino acids having at least one ionizable side chain.

19. A liposome according to claim 4, wherein the cyclic D,L α peptide comprises one or more ionizable amino acids that when exposed to a pH which allows

protonation sufficient to cause self assembly of the cyclic D,L α peptide will cause the cyclic D,L α peptide to self assemble into a supramolecular structure.

20. A liposome according to claim 19, wherein the pH is below about 7.0.

21. A liposome according to claim 4, wherein the cyclic D,L α peptide comprises an amino acid having at least one ionizable side chain, the amino acid selected from the group consisting of aspartic acid, glutamic acid, lysine, arginine, tyrosine, ornithine, histidine, serine, and cystine.

22. A pharmaceutical composition for introducing an organic nanotube into a cell of a host, comprising:
    (a) a liposome, the liposome comprising a lipopeptide, said lipopeptide comprising a lipid covalently attached to a peptide;
    (b) an inactivated organic nanotube enclosed in the liposome; and
    (c) a pharmaceutically acceptable carrier.

23. A method of introducing an organic nanotube into a cell, comprising:
    (a) contacting a cell with a composition comprising a liposome comprising
        i. a lipopeptide, said lipopeptide including a lipid covalent attached to a peptide, and
        ii. an inactivated organic nanotube enclosed in the liposome; and
    (b) allowing the cell to take up the composition.

24. A method according to claim 23, wherein the lipopeptide comprises a fusion peptide.

25. A method according to claim 23, wherein the inactivated organic nanotube comprises a cyclic peptide.

26. A method according to claim 25, wherein the cyclic peptide comprises a cyclic D,L-α-peptide.

27. A method according to claim 23, wherein the liposome comprises an interior that is maintained at a pH from about 7.0 to about 14.5.

28. A method according to claim 23, wherein the liposome comprises an interior that is maintained at a pH from about 7.0 to about 10.5.

29. A method according to claim 23, wherein the inactivated organic nanotube is activated by a change in pH.

30. A method according to claim 23, wherein the inactivated organic nanotube is activated by a chemical reaction.

31. A method according to claim 23, wherein the inactivated organic nanotube is activated by a change in temperature.

32. A method according to claim 23, wherein the inactivated organic nanotube is activated by electromagnetic radiation.

33. A method according to claim 32, wherein the electromagnetic radiation is selected from the group consisting of ultraviolet radiation, visible radiation, infrared radiation, and microwave radiation.

34. A method of treating a patient comprising:
    (a) introducing into a patient a first pharmaceutical composition, comprising a liposome comprising
        i. a lipopeptide, said lipopeptide including a lipid covalent attached to a peptide, and
        ii. an inactivated organic nanotube enclosed in the liposome; and

(b) introducing into the patient a pharmaceutically effective amount of a second pharmaceutically active composition, or a pharmaceutically acceptable salt thereof, whereby the first pharmaceutical composition and the second pharmaceutical composition are present in the patient simultaneously.

35. A method according to claim 34, wherein the lipopeptide comprises a fusion peptide.

36. A method according to claim 34, wherein the inactive organic nanotube comprises a cyclic peptide.

37. A method according to claim 36, wherein the cyclic peptide comprises a cyclic D,L-α-peptide.

38. A method according to claim 34, wherein the liposome comprises an interior that is maintained at a pH from about 7.0 to about 14.5.

39. A method according to claim 34, wherein the liposome comprises an interior that is maintained at a pH from about 7.0 to about 10.5.

40. A method according to claim 34, wherein the inactivated organic nanotube is activated by a chemical reaction.

41. A method according to claim 34, wherein the inactivated organic nanotube is activated by a change in pH.

42. A method according to claim 34, wherein the inactivated organic nanotube is activated by electromagnetic radiation.

43. A method according to claim 42, wherein the electromagnetic radiation is selected from the group consisting of ultraviolet radiation, visible radiation, infrared radiation, and microwave radiation.

44. A method according to claim 34, wherein the inactivated organic nanotube is activated by a change in temperature.

45. A method according to claim 34, wherein the inactivated organic nanotube is activated by a chemical reaction.

46. A method according to claim 34, wherein the second pharmaceutically active composition comprises an antitumor composition.

47. A method according to claim 34, wherein the second pharmaceutically active composition comprises an antiviral composition.

48. A method according to claim 34, wherein the second pharmaceutically active composition comprises an antibacterial composition.